

CLAIMS

What is claimed is:

1. A method comprising:
issuing an instruction selected from a queue;
enqueueing the instruction issued within a recirculation queue in one of a blocked state and an unblocked state if completion of the instruction is prevented by a detected blocking condition; and
reissuing a selected instruction from the recirculation queue once a detected blocking condition of an instruction within the recirculation queue is satisfied.
2. The method of claim 1, wherein issuing comprises:
arbitrating between a plurality of queues to select a queue;
selecting a current instruction from the queue selected; and
issuing the current instruction for the queue selected.
3. The method of claim 2, wherein issuing the current instruction comprises:
determining a state of the current instruction;
selecting an alternate queue from the plurality of queues if a state of the selected instruction is blocked; and
issuing an instruction selected from the alternate selected queue.
4. The method of claim 1, wherein enqueueing comprises:
detecting the blocking condition prohibiting the instruction issued from completion;
placing the instruction within the recirculation queue;
setting a state of the instruction as blocked to prohibit reissue of the instruction;
and
storing the detected blocking condition.

5. The method of claim 1, further comprising:
 - identifying blocking conditions of instructions within the recirculation queue;
 - determining whether any blocking condition of any instruction within the recirculation queue is satisfied;
 - enabling recirculation of instructions from the recirculation queue by setting a state of each instruction within the recirculation queue to an unblocked state if any blocking condition is satisfied.
6. The method of claim 1, wherein reissuing instructions comprises:
 - receiving a request to issue an instruction contained within the recirculation queue;
 - determining a state of a current instruction of the recirculation queue;
 - issuing the current instruction if the state of the current instruction is an unblocked state in response to the received request; and
 - disregarding the request if the state of the current instruction is a blocked state.
7. The method of claim 1, wherein enqueueing comprises:
 - determining whether the detected blocking condition preventing the instruction issued from completion is a transient blocking condition;
 - setting a state of the instruction to an unblocked state if the detected blocking condition is transient; and
 - resetting a state of each instruction within the recirculation queue to an unblocked state.
8. The method of claim 1, wherein reissuing selected instructions comprises:
 - issuing an unblocked instruction in response to a received request;
 - enqueueing the reissued instruction if a blocking condition of the instruction remains unsatisfied;
 - setting a state of the reissued instruction to a blocked state; and
 - storing the blocking condition.
9. The method of claim 1, wherein the detected blocking condition is one of a data blocking condition and a resource blocking condition.

10. The method of claim 1, wherein the recirculation queue is a first in, first out circular queue.

11. An article of manufacture including a machine readable medium having stored thereon instructions which may be used to program a system to perform a method, comprising:

issuing an instruction selected from a queue;

enqueueing the instruction issued within a recirculation queue in one of a blocked state and an unblocked state if completion of the instruction is prevented by a detected blocking condition; and

reissuing a selected instructions from the recirculation queue once a detected blocking condition of an instruction within the recirculation queue is satisfied.

12. The article of manufacture of claim 11, wherein issuing comprises:

arbitrating between a plurality of queues to select a queue;

selecting a current instruction from the queue selected; and

issuing the current instruction from the queue selected.

13. The article of manufacture of claim 12, wherein issuing comprises:

determining a state of the current instruction;

selecting an alternate queue from the plurality of queues if a state of the selected instruction is blocked; and

issuing an instruction selected from the alternate selected queue

14. The article of manufacture of claim 11, wherein enqueueing comprises:

detecting the blocking condition prohibiting the instruction issued from completion;

placing the instruction within the recirculation queue;

setting a state of the instruction as blocked to prohibit reissue of the instruction;

and

storing the detected blocking condition.

15. The article of manufacture of claim 11, wherein the method further comprises:

- identifying blocking conditions of instructions within the recirculation queue;
- determining whether any blocking condition of any instruction within the recirculation queue is satisfied;

- enabling reissuing of instructions from the recirculation queue by setting a state of each instruction within the recirculation queue to an unblocked state if any blocking condition is satisfied.

16. The article of manufacture of claim 11, wherein reissuing selected instructions comprises:

- receiving a request to issue an instruction contained within the recirculation queue;

- determining a state of a current instruction of the recirculation queue;

- issuing a current instruction if the state of the current instruction is an unblocked state; and

- disregarding the request if the state of the current instruction is a blocked state.

17. The article of manufacture of claim 11, wherein enqueueing comprises:

- determining whether the detected blocking condition preventing the instruction issued from completion is a transient blocking condition;

- setting a state of the instruction to an unblocked state if the detected blocking condition is transient; and

- resetting a state of each instruction within the recirculation queue to an unblocked state.

18. The article of manufacture of claim 11, wherein reissuing selected instructions comprises:

- issuing an unblocked instruction in response to a received request;

- enqueueing the reissued instruction if a blocking condition of the instruction remains unsatisfied;

- setting a state of the reissued instruction to a blocked state; and

- storing the blocking condition.

19. The article of manufacture of claim 11, wherein the detected block condition is one of a data blocking condition and a resource blocking condition.

20. The article of manufacture of claim 12, wherein the recirculation queue is a first in, first out circular queue.

21. An apparatus, comprising:
a received instruction queue to store received instructions;
a recirculation queue;
arbitration logic to select one of the received instruction queue and the recirculation queue from which to issue a current instruction; and
blocked instruction detection logic to identify instructions blocked from execution by detected blocking conditions, and to enqueue the instructions onto the recirculation queue in one of a blocked state and an unblocked state, including a respective blocking condition of each instruction within the recirculation queue.

22. The apparatus of claim 21, wherein the blocked instruction detect logic further comprises:

blocked condition satisfaction logic to detect whether a blocking condition of an instruction within the recirculation queue is satisfied and to set a state of each instruction within the recirculation queue to an unblocked state if a blocking condition of an instruction within the recirculation queue is satisfied.

23. The apparatus of claim 21, wherein the arbitration logic to determine a state of a selected instruction, select the received instruction queue if a state of the selected instruction is blocked, and issue an instruction selected from the received instruction queue.

24. The apparatus of claim 21, wherein the blocked instruction detect logic to determine whether the detected blocking condition is a transient blocking condition, set a state of the instruction placed within the queue to an unblocked state if the detected blocking condition is transient, and reset a state of each instruction within the

recirculation queue to an unblocked state to enable reissue of instructions contained within the recirculation queue.

25. The apparatus of claim 21, wherein the blocked instruction detect logic to enqueue a reissued instruction if a blocking condition of the instruction remains unsatisfied, to set a state of the reissued instruction to a blocked state and to store the blocking condition.

26. A system comprising:
a memory controller coupled to a memory;
a processor coupled to the memory via a bus, the processor including:
a bus interface unit coupling an execution core to a cache memory
including:
a received instruction queue to store received instructions,
a recirculation queue,
arbitration logic to select one of the received instruction queue and
the recirculation queue from which to issue a current instruction, and
blocked instruction detection logic to identify instructions blocked
from execution by detected blocking conditions, and to enqueue the instructions
onto the recirculation queue in one of a blocked state and an unblocked state,
including a respective blocking condition of each instruction within the
recirculation queue.

27. The system of claim 26, wherein the blocked instruction detect logic further comprises:

blocked condition satisfaction logic to detect whether a blocking condition of an instruction within the recirculation queue is satisfied and to set a state of each instruction within the recirculation queue to an unblocked state if a blocking condition of an instruction within the recirculation queue is satisfied.

28. The system of claim 26, wherein the arbitration logic to determine a state of a selected instruction, select the received instruction queues if a state of the selected

instruction is blocked, and issue an instruction selected from the received instruction queue.

29. The system of claim 26, wherein the blocked instruction detect logic to determine whether the detected blocking condition is a transient blocking condition, set a state of the instruction placed within the queue to an unblocked state if the detected blocking condition is transient, and reset a state of each instruction within the recirculation queue to an unblocked state to enable reissue of instructions contained within the recirculation queue.

30. The system of claim 26, wherein the blocked instruction detect logic to enqueue the reissued instruction if a blocking condition of the instruction remains unsatisfied, to set a state of the reissued instruction to a blocked state and to store the blocking condition.